

What Is Claimed Is:

1. A method of compiling a program comprising:
 - identifying a set of speculative parallel thread candidates;
 - determining cost values for at least some of the speculative parallel thread candidates;
 - selecting a set of speculative parallel threads from the set of speculative parallel thread candidates based on the cost values; and
 - generating program code based on the set of speculative parallel threads.
2. A method as defined in claim 1 wherein identifying the set of speculative parallel thread candidates comprises identifying program regions.
3. A method as defined in claim 1 wherein at least one of the speculative parallel thread candidates comprises at least one program region.
4. A method as defined in claim 1 wherein at least one of the speculative parallel threads comprises at least one program region.
5. A method as defined in claim 1 wherein identifying the set of speculative parallel thread candidates comprises identifying program loops.

6. A method as defined in claim 1 wherein at least one of the speculative parallel thread candidates comprises a program loop.
7. A method as defined in claim 1 wherein at least one of the speculative parallel threads comprises a program loop.
8. A method as defined in claim 1 wherein identifying the set of speculative parallel thread candidates comprises identifying a main thread.
9. A method as defined in claim 8 wherein the main thread comprises a current iteration of a program loop, and the speculative parallel thread candidate comprises a next iteration of the same program loop.
10. A method as defined in claim 8 wherein the main thread comprises a current iteration of a program loop, and the speculative parallel thread comprises a next iteration of the same program loop.
11. A method as defined in claim 1 wherein the cost value is a misspeculation cost.
12. A method as defined in claim 11 wherein determining the misspeculation cost comprises:
identifying a data dependency in the speculative parallel thread candidate;

determining, for the data dependency, a likelihood that a dependency violation will occur; and

determining an amount of computation required to recover from the data dependency violation.

13. A method as defined in claim 1 further comprising determining at least one of the following for at least one of the speculative parallel thread candidates:

a size of the speculative parallel thread candidate; and

a likelihood representative of the speculative parallel thread candidate.

14. A method as defined in claim 1 wherein at least one of the speculative parallel thread candidates is transformed prior to determining the cost value for the at least one of the speculative parallel thread candidates.

15. A method as defined in claim 14 wherein the at least one of the speculative parallel thread candidates is transformed by a code reordering.

16. A method as defined in claim 14 further comprising determining at least one of the following for at least one of the speculative parallel thread candidates:

a size of the speculative parallel thread candidate;

a likelihood representative of the speculative parallel thread candidate;

and

a description of the transformation performed on the speculative parallel thread candidate.

17. A method as defined in claim 1 wherein at least one of the speculative parallel threads is transformed prior to code generation.

18. A method as described in claim 17 wherein the at least one of the speculative parallel threads is transformed by code reordering.

19. An article of manufacture storing machine readable instructions that, when executed, cause a machine to:

identify a set of speculative parallel thread candidates;
determine a cost value for at least one of the speculative parallel thread candidates;
select a set of speculative parallel threads from the set of speculative parallel thread candidates based on the cost values; and
generate program code based on the set of speculative parallel threads.

20. An article of manufacture as defined in claim 19 wherein the cost value is a misspeculation cost.

21. An article of manufacture as defined in claim 20 wherein, to determine the misspeculation cost, the machine readable instructions cause the machine to:

identify a data dependency in the speculative parallel thread candidate; determine, for the data dependency, a likelihood that a dependency violation will occur; and determine an amount of computation required to recover from the data dependency violation.

22. An article of manufacture as defined in claim 19 wherein the machine readable instructions cause the machine to determine at least one of the following for at least one of the speculative parallel thread candidates:

a size of the speculative parallel thread candidate; and

a likelihood representative of the speculative parallel thread candidate.

23. An article of manufacture as defined in claim 19 wherein the machine readable instructions cause the machine to transform at least one of the speculative parallel thread candidates prior to determining the cost value.

24. An apparatus to compile a program comprising:

a candidate identifier to identify a set of speculative parallel thread candidates;

a metric estimator to determine a cost value for at least one of the speculative parallel thread candidates;

a speculative parallel thread selector to select a set of speculative parallel threads from the set of speculative parallel thread candidates based on the cost values; and

a code generator to generate program code based on the set of speculative parallel threads.

25. An apparatus as defined in claim 24 wherein the candidate identifier comprises a region identifier to identify program regions.

26. An apparatus as defined in claim 24 wherein the candidate identifier comprises a loop identifier to identify program loops.

27. An apparatus as defined in claim 24 wherein the candidate identifier comprises a candidate selector to select a first one of a program region and a program loop iteration to execute in a main thread, and to select a second one of a program region and a program loop iteration to execute in a speculative parallel thread.

28. An apparatus as defined in claim 24 wherein the metric estimator determines a misspeculation cost.

29. An apparatus as defined in claim 24 wherein the metric estimator comprises:

a data dependency identifier to identify a data dependency in the speculative parallel thread candidate;

a likelihood evaluator to determine a likelihood that a dependency violation will occur; and

a recovery size calculator to determine an amount of computation required to recover from the data dependency violation.

30. An apparatus as defined in claim 24 wherein the candidate identifier determines at least one of the following for at least one of the speculative parallel thread candidates:

- a size of the speculative parallel thread candidate; and
- a likelihood representative of the speculative parallel thread candidate.

31. A system to compile a program comprising:

a candidate identifier to identify a set of speculative parallel thread candidates;

a metric estimator to determine a cost value for at least one of the speculative parallel thread candidates;

a speculative parallel thread selector to select a set of speculative parallel threads from the set of speculative parallel thread candidates based on the cost values;

a code generator to generate program code based on the set of speculative parallel threads; and

a static random access memory to store the cost values.

32. A system as define in claim 31 wherein the metric estimator comprises:

a data dependency identifier to identify a data value dependency in

the speculative parallel thread candidate;
a likelihood evaluator to determine a likelihood that a dependency
violation will occur; and
a recovery size calculator to determine a set of recovery computation
sizes that represent an amount of computation required to recover from the data
dependency violation.